

DEPARTMENT OF CONSUMER AND INDUSTRY SERVICES

DIRECTOR'S OFFICE

GENERAL INDUSTRY SAFETY STANDARDS

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(By authority conferred on the director of the department of consumer and industry services by sections 16 and 21 of Act No. 154 of the Public Acts of 1974, as amended, and Executive Reorganization Order No. 1996-2, being §§408.1016, 408.1021, and 445.2001 of the Michigan Compiled Laws))

R 408.17701, R 408.17703, R 408.17705, R 408.17707, and R 408.17716 of the Michigan Administrative Code, appearing on pages 699 to 702, 704, and 705 of the 1988 Annual Supplement to the 1979 Michigan Administrative Code, are amended, and R 408.17719 is added, to read as follows:

Bureau of Safety and Regulation, Standards Division Web-Site: www.cis.state.mi.us/bsr/divisions/std

PART 77. GRAIN HANDLING FACILITIES

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R 408.17701. Definitions.

Rule 7701. (1) "Choked leg" means a condition of material buildup in the bucket elevator that results in the stoppage of material flow and bucket movement. A bucket elevator is not considered choked if it has the up leg partially or fully loaded and has the boot and discharge cleared allowing bucket movement.

(2) "Flat storage structure" means a grain storage building or structure which will not empty completely by gravity, which has an unrestricted ground level opening for entry, and which must be entered to reclaim the residual grain using powered equipment or manual means.

(3) "Fugitive grain dust" means combustible dust particles which are emitted from the stock handling system and which are a size that will pass through a United States standard 40-mesh sieve (425 microns or less).

(4) "Grain elevator" means a facility that is engaged in the receipt, handling, storage, and shipment of bulk raw agricultural commodities, such as corn, wheat, oats, barley, sunflower seeds, and soybeans.

(5) "Hot work" means work that involves electric or gas welding, cutting, or brazing or similar flame-producing operations.

(6) "Inside bucket elevator" means a bucket elevator that has the boot and more than 20% of the total leg height, which is above grade or ground level, inside the grain elevator structure. Bucket elevators with leg casings that are inside of and pass through the roofs of, rail or truck dump sheds with the remainder of the leg outside of the grain elevator structure are not considered inside bucket elevators.

(7) "Jogging" means the repeated starting and stopping of drive motors in an attempt to clear choked legs.

(8) "Lagging" means a covering on drive pulleys used to increase the coefficient of friction between the pulley and the belt.

(9) "Permit" means the written certification of the employer which authorizes employees to perform identified work operations subject to specified precautions.

R 408.17702. Scope.

Rule 7702. This part contains requirements for the control of grain dust fires and explosions and certain other safety hazards associated with grain handling facilities.

R 408.17703. Applicability of rules.

Rule 7703. (1) R 408.17701, R 408.17702, and R 408.17704 to R 408.17714 apply to all the following:

- (a) Grain elevators.
 - (b) Feed mills.
 - (c) Flour mills.
 - (d) Rice mills.
 - (e) Dust pelletizing plants.
 - (f) Dry corn mills.
 - (g) Soybean flaking operations.
 - (h) The dry grinding operations of soycake.
- (2) R 408.17715 to R 408.17717 apply only to grain elevators.

(3) These rules do not apply to seed plants that handle and prepare seeds for the planting of future crops or to on-form storage of feed lots.

R 408.17704. Employee emergency plan and fire prevention plan.

Rule 7704. (1) This rule applies to all emergency action plans required by the occupational safety and health act

of 1970, 29 U.S.C. §651 et seq. The emergency action plan shall be in writing, except as provided in subrules (5), (6), and (7) of this rule, and shall cover those designated actions employers and employees must take to ensure employee safety from fire and other emergencies.

(2) All of the following elements, shall be included in the plan:

- (a) Emergency escape procedures and emergency escape route assignments.
 - (b) Procedures to be followed by employees who remain to operate critical plant operations before they evacuate.
 - (c) Procedures to account for all employees after emergency evacuation has been completed.
 - (d) Rescue and medical duties for those employees who are to perform them.
 - (e) The preferred means of reporting fires and other emergencies.
 - (f) Names of regular job titles of persons or departments that can be contacted for further information or explanation of duties under the plan.
- (3) An alarm system shall comply with both of the following provisions:

- (a) An employer shall establish an employee alarm system which complies with R 408.17717.
- (b) If the employee alarm system is used for altering fire brigade members or for other purposes, a distinctive signal for each purpose shall be used.
- (4) An employer shall establish, in the emergency action plan, the types of evacuation to be used in emergency circumstances.

(5) Before implementing the emergency action plan, an employer shall designate and train a sufficient number of persons to assist in the safe and orderly emergency evacuation of employees.

(6) An employer shall review the plan with each employee covered by the plan at all of the following times:

- (a) Initially when the plan is developed.
- (b) When an employee's responsibilities or designated actions under the plan change.
- (c) When the plan is changed.

(7) An employer shall review, with each employee, upon initial assignment, those parts of the plan which an employee must know to protect the employee in the event of an emergency. The written plan shall be kept at the workplace and made available for employee review. For those employers with 10 or fewer employees, the plan may be communicated orally to employees and the employer need not maintain a written plan.

R 408.17705. Training.

Rule 7705. (1) An employer shall provide training to each employee at least annually and when a change in job assignment will expose an employee to new hazards. Current employees and new employees shall be trained in at least both of the following areas:

- (a) General safety precautions associated with the facility, including recognition and preventive measures for the hazards related to dust accumulations and common ignition sources such as smoking.
- (b) Specific procedures and safety practices applicable to an employee's job tasks, including all of the following:
 - (i) Cleaning procedures for grinding equipment.
 - (ii) Cleaning procedures for choked legs.
 - (iii) Housekeeping procedures.
 - (iv) Hot work procedures.
 - (v) Preventive maintenance procedures.
 - (vi) Lockout-tagout procedures.

New employees shall be trained before beginning work.

(2) Employees assigned special tasks, such as bin entry and the handling of flammable or toxic substances, shall be provided with training to perform these tasks safely.

(3) Training for an employee who enters grain storage structures shall include training about engulfment and mechanical hazards and how to avoid engulfment and mechanical hazards.

R 408.17706. Hot work permits.

Rule 7706. (1) An employer shall issue a permit for all hot work, with the following exceptions:

- (a) Where an employer or a representative of the employer who would otherwise authorize the permit is present while the hot work is being performed.
- (b) Hot work in welding shops authorized by an employer.
- (c) Hot work in hot work areas authorized by an employer which are located outside of the grain handling structure.

(2) The permit shall certify that the requirements contained in rule 1261 of general industry safety standard, Part 12. Welding and Cutting, being R 408.11261 of the Michigan Administrative Code, have been implemented before beginning the hot work operations. The permit shall be kept on file until completion of the hot work operations..

R 408.17707. Entry into bins, silos, tanks, and other grain storage structures.

Rule 7707. (1) This rule applies to employees entering bins, silos, tanks, and other grain storage structures, except for entry through unrestricted ground level openings into flat storage structures in which there is no toxicity, flammability, oxygen deficiency, or other atmospheric hazards, which is covered by R 408.17719. For the purposes of this rule, the term "grain" includes raw and processed grain and grain products in facilities specified in R 408.17703.

(2) All of the following actions shall be taken before employees enter bins, silos, tanks, or other grain storage structures:

- (a) An employer shall issue a permit for entering bins, silos, tanks, or other grain storage structures unless the employer or a representative of the employer who would otherwise authorize the permit is present during the entire operation. The permit shall certify that the precautions contained in this subrule have been implemented before employees enter bins, silos, tanks, or other grain storage structures. The permit shall be kept on file until completion of the entry operations.
- (b) All mechanical, electrical, hydraulic, and pneumatic equipment that presents a danger to employees inside grain storage structures shall be de-energized, disconnected, locked out and tagged, blocked off, or prevented from operating by other equally effective means or methods.
- (c) The atmosphere within a bin, silo, tank, or other grain storage structure shall be tested for the presence of combustible gases, vapors, and toxic agents when an employer has reason to believe they may be present. Additionally, the atmosphere within a bin, silo, tank, or other grain storage structure shall be tested for oxygen content, unless there is continuous natural air movement or continuous forced-air ventilation before and during the period employees are inside the bin, silo, tank, or other grain storage structure. If the oxygen level is less than 19.5%, if combustible gas or vapor is detected in excess of 10% of the lower flammable limit, or if toxic agents are present in excess of the ceiling values listed in R 325.51101 et seq., which is

available free of charge from the Michigan Department of Consumer and Industry Services, 3500 N. Martin L. King Blvd., P.O. Box 30649, Lansing, Michigan 48909, or if toxic agents are present in concentrations that will cause health effects that prevent employees from effecting self-rescue or communication to obtain assistance, then both of the following provisions apply:

- (i) Ventilation shall be provided until the unsafe condition or conditions are eliminated. Ventilation shall be continued as long as there is a possibility of recurrence of the unsafe condition while the bin, silo, tank, or other grain storage structure is occupied by an employee.
- (ii) If toxicity or oxygen deficiency cannot be eliminated by ventilation, then an employee entering the bin, silo, tank, or other grain storage structure shall wear an appropriate respirator. Respirator use shall be in accordance with the requirements of occupational health rule 3502, which is available from the Michigan Department of Consumer and Industry Services, 3500 N. Martin L. King Blvd., P.O. Box 30649, Lansing, Michigan 48909.

(3) If an employee enters a grain storage structure from a level at or above the level of the stored grain or grain products, or if an employee walks or stands on or in stored grain that is deep enough to pose an engulfment hazard, then the employer shall provide the employee with a body harness that has a lifeline or a boatswain's chair that meets the requirements of R 408.10529 of the Michigan Administrative Code. The lifeline shall be so positioned and of sufficient length to prevent the employee from sinking more than waist deep in the grain. If the employer can demonstrate that the protection required by this rule creates a greater hazard, then the employer shall provide an alternative means of protection that has been demonstrated to prevent an employee from sinking more than waist deep in the grain. If an employee is standing or walking on a surface that the employer has demonstrated does not pose an engulfment hazard, then the lifeline or alternative means may be disconnected or removed.

(4) An observer who is equipped to provide assistance shall be stationed outside the bin, silo, tank, or other grain storage structure being entered by an employee. Visual, voice, or signal line communications shall be maintained between the observer and the employee entering the bin, silo, tank, or other grain storage structure.

(5) An employer shall provide equipment for rescue operations that is specifically suited for the bin, silo, tank, or other grain storage structure being entered.

(6) An employee acting as an observer shall be trained in rescue procedures, including notification methods for obtaining additional assistance.

(7) An employee shall not enter a bin, silo, tank, or other grain storage structure underneath a bridging condition or where a buildup of grain products on the sides could fall and bury the employee.

(8) An employee shall not walk down grain or perform a similar practice where an employee walks on grain to make it flow within or out from a grain storage structure. An employee shall not be on moving grain.

R 408.17708. Contractor notification of potential hazards and emergency action plan.

Rule 7708. (1) An employer shall inform a contractor performing work at the grain handling facility of known potential fire and explosion hazards related to the contractor's work and work area. An employer shall also inform a contractor of the applicable safety rules of the facility.

(2) An employer shall explain the applicable provisions of the emergency action plan to a contractor.

R 408.17709. Housekeeping program.

Rule 7709. (1) An employer shall develop and implement a written housekeeping program that establishes the frequency and method determined to best reduce accumulations of fugitive grain dust on ledges, floors, equipment, and other exposed surfaces.

(2) In addition, the housekeeping program for grain elevators shall address fugitive grain dust accumulations at priority housekeeping areas. Priority housekeeping areas shall include, all of the following areas:

- (a) Floor areas within 35 feet (10.7m) of inside bucket elevators.
- (b) Floors of enclosed areas containing grinding equipment.
- (c) Floors of enclosed areas containing grain dryers located inside the facility.

Pursuant to the housekeeping program, an employer shall immediately remove any fugitive grain dust accumulations when they exceed 1/8 of an inch (.32cm) at priority housekeeping areas or shall demonstrate and assure, through the development and implementation of the housekeeping program, the equivalent protection is provided.

(3) The use of compressed air to blow dust from ledges, walls or other areas shall only be permitted when all machinery that presents an ignition source in the area is shut down and all other known potential ignition sources in the area are removed or controlled.

(4) Grain and product spills shall not be considered fugitive grain dust accumulations. However, the housekeeping program shall address the procedures for removing such spills from the work area.

R 408.17710. Receiving pit feed openings; grates.

Rule 7710. Receiving pit feed openings, such as truck or railcar receiving pits, shall be covered by grates. The width of the openings in the grates shall be a maximum of 2 1/2 inches (6.35cm).

R 408.17711. Filter collectors; monitoring devices; location.

Rule 7711. (1) Not later than March 30, 1989, all fabric dust filter collectors which are a part of a pneumatic dust collection system shall be equipped with a monitoring device that will indicate a pressure drop across the surface of the filter.

(2) Filter collectors installed after the effective date of these rules shall be located in any of the following areas:

- (a) Outside the facility.
- (b) In an area inside the facility protected by an explosion suppression system.
- (c) In an area inside the facility that is separated from other areas of the facility by construction having at least a 1-hour-fire-resistance rating and which is adjacent to an exterior wall and vented to the outside. The vent and ductwork shall be designed to resist rupture due to deflagration.

R 408.17712. Preventive maintenance procedures.

Rule 7712. (1) An employer shall implement preventive maintenance procedures as follows:

- (a) Conduct regularly scheduled inspections of at least the mechanical and safety control equipment associated with all of the following:
 - (i) Dryers.
 - (ii) Grain stream processing equipment.
 - (iii) Dust collection equipment, including filter collectors.
 - (iv) Bucket elevators.
- (b) Lubrication and other appropriate maintenance in accordance with manufacturers' recommendations

or as determined necessary based on previous operating records.

(2) An employer shall promptly correct dust collection systems which are malfunctioning or which are operating below designed efficiency. Additionally, an employer shall promptly correct, or remove from service, overheated bearings and slipping or misaligned belts associated with inside bucket elevators.

(3) A certification record shall be maintained of each inspection performed in accordance with this rule and shall contain all of the following information:

- (a) The date of the inspection.
- (b) The name of the person who performed the inspection.
- (c) The serial number or other identifier of the equipment specified in subrule (1)(a) of this rule that was inspected.

(4) An employer shall implement procedures for the use of tags and locks which will prevent the inadvertent application of energy or motion to equipment which is being repaired, serviced, or adjusted and which could result in employee injury. Such locks and tags shall be removed in accordance with established procedures only by the employee installing them or, if the installing employee is unavailable, by his or her supervisor.

R 408.17713. Grain stream processing equipment.

Rule 7713. An employer shall equip grain stream processing equipment, such as hammer mills, grinders, and pulverizers, with an effective means of removing ferrous material from the incoming grain stream.

R 408.17714. Emergency escape.

Rule 7714. (1) An employer shall provide not less than 2 means of emergency escape from galleries (bin decks).

(2) An employer shall provide at least 1 means of emergency escape in tunnels of existing grain elevators. Tunnels in grain elevators constructed after the effective date of these rules shall be provided with not less than 2 means of emergency escapes.

R 408.17715. Continuous-flow bulk raw grain dryers.

Rule 7715. (1) Not later than April 1, 1991, all direct-heat grain dryers shall be equipped with automatic controls that do both of the following:

- (a) Shut off the fuel supply in case of power or flame failure or interruption of air movement through the exhaust fan.
- (b) Stop the grain from being fed into the dryer if excessive temperature occurs in the exhaust of the drying section.

(2) Direct-heat grain dryers installed after the effective date of these rules shall be located in any of the following areas:

- (a) Outside the grain elevators.
- (b) In an area inside the grain elevator which is protected by a fire or explosion suppression system.
- (c) In an area inside the grain elevator which is separated from other areas of the facility by construction having at least a 1-hour-fire-resistance rating.

R 408.17716. Bucket elevators generally.

Rule 7716. (1) Bucket elevators shall not be jogged to free a choked leg.

(2) All belts and lagging purchased after the effective date of these rules shall be conductive. Belts shall have a surface electrical resistance of not more than 300 megohms.

(3) A bucket elevator shall be equipped with a means of access to the head pulley section to allow inspection of the head pulley, lagging belt, and discharge throat of the elevator head. The boot section shall also be provided with a means of access for cleanout of the boot and for inspection of the boot, pulley, and belt.

(4) An employer shall mount bearings externally to the leg casing or shall provide vibration monitoring, temperature monitoring, or other means to the condition of those bearings mounted inside or partially inside the leg casing.

(5) An employer shall equip a bucket elevator with a motion detection device that will shut down the bucket elevator when the belt speed is reduced by not more than 20% of the normal operating speed.

(6) An employer shall equip a bucket elevator with a belt alignment monitoring device that will initiate an alarm to employees when the belt is not tracking properly or shall provide a means to keep the belt tracking properly, such as a system that provides constant alignment adjustment of belts.

(7) Subrules (5) and (6) of this rule do not apply to grain elevators that have a permanent storage capacity of less than 1,000,000 bushels if daily visual inspection is made of bucket movement and tracking of the belt.

(8) Subrules (4), (5), and (6) of this rule do not apply to either of the following:

- (a) A bucket elevator that is equipped with an operational fire and explosion suppression system capable of protecting at least the head and boot section of the bucket elevator.
- (b) A bucket elevator that is equipped with pneumatic or other dust control systems or methods that keep the dust concentration inside the bucket elevator at least 25% below the lower explosive limit at all times during operations.

R 408.17717. Employee alarm systems generally.

Rule 7717. (1) This rule applies to all employee emergency alarms installed to meet a particular occupational safety and health act standard. This rule does not apply to those discharge or supervisory alarms required on various fixed extinguishing systems or to supervisory alarms on fire suppression, alarm, or detection systems, unless they are intended to be employee alarm systems.

(2) The requirements in this rule that pertain to maintenance, testing, and inspection shall apply to all local fire alarm signaling systems used for alerting employees, regardless of the other functions of the systems.

(3) All pre-discharge employee alarms installed to meet a particular occupational safety and health act standard shall meet the requirements of subrules (4) to (9) and subrule (11) of this rule.

(4) An employee alarm system shall do both of the following:

- (a) Provide warning for necessary emergency action as called for in the emergency action plan.
- (b) Provide for reaction time for the safe escape of employees from the workplace or the immediate work area.

(5) An employee alarm shall be capable of being perceived above ambient noise or light levels by all employees in the affected portions of the workplace. Tactile devices may be used to alert those employees who would not otherwise be able to recognize the audible or visual alarm.

(6) An employee alarm shall be distinctive and recognizable as a signal to evacuate the work area or to perform actions designated under the emergency action plan.

(7) An employer shall explain to each employee the preferred means of reporting emergencies, such as manual pull box alarms, public address systems, radios, or telephones. The employer shall post emergency telephone numbers near telephones or employee notice boards and at other conspicuous locations when telephones serve as a means of reporting emergencies. Where a communication system also serves as the employee alarm system, all emergency messages shall have priority over all nonemergency messages.

(8) An employer shall establish procedures for sounding emergency alarms in the workplace. For those employers with 10 or fewer employees in a particular workplace, direct voice communication is an acceptable procedure for sounding the alarm if all employees can hear the alarm. Such workplaces need not have a backup system.

(9) An employer shall assure that all devices, components, combinations of devices, or systems constructed and installed to comply with these rules are approved. Steam whistles, air horns, strobe lights, or similar lighting devices or tactile devices meeting the requirements of this rule are considered to meet the requirements for approval.

(10) An employer shall assure that all employee alarm systems are restored to normal operating condition as promptly as possible after each test or alarm. Spare alarm devices and components subject to wear or destruction shall be available in sufficient quantities and locations for prompt restoration of the system.

(11) An employer shall assure that all employee alarm systems are maintained in operating condition, except when undergoing repairs or maintenance.

(12) An employer shall assure that a test of the reliability and adequacy of nonsupervised employee alarm systems is made every 2 months. A different actuation device shall be used in each test of multi-actuation device system so that an individual device is not used for 2 consecutive tests.

(13) An employer shall maintain or replace power supplies as often as is necessary to assure a fully operational condition. Backup means of alarm, such as employee runners or telephones, shall be provided when systems are out of service.

(14) An employer shall assure that employee alarm circuitry which is installed after January 1, 1981, and which is capable of being supervised is supervised and that it will provide positive notification to assigned personnel when a deficiency exists in the system. An employer shall assure that all supervised employee alarm systems are tested at least annually for reliability and adequacy.

(15) An employer shall assure that the servicing, maintenance, and testing of employee alarms are done by a person trained in the design operation and functions necessary for reliable and safe operation of the system.

(16) An employer shall assure that manually operated actuation devices for use in conjunction with employee alarms are unobstructed, conspicuous, and readily accessible.

R 408.17719. Entry into flat storage structures.

Rule 7719. (1) For the purposes of this rule, the term "grain" means raw and processed grain products in facilities within the scope of R 408.17703.

(2) An employee who walks or stands on or in stored grain that is deep enough to pose an engulfment hazard shall be equipped with a lifeline or alternative means that the employer demonstrates will prevent the employee from sinking more than waist deep into the grain. If an employee is standing or walking on a surface that the employer has demonstrated does not pose an engulfment hazard, then the lifeline or alternative means may be disconnected or removed.

(3) If an employee walks or stands on or in stored grain or grain products deep enough to pose an engulfment hazard, then all equipment that presents a danger to the employee, such as an auger or other grain transport equipment, shall be de-energized and shall be disconnected, locked-out and tagged, blocked-off, or otherwise prevented from operating by other equally effective means or methods. An employee shall not walk down grain or perform similar practices where an employee walks on grain to make it flow within or out from a grain storage structure. An employee shall not be on moving grain.

(4) An employee shall not be permitted to be either underneath a bridging condition or in any other location where an accumulation of grain on the sides or elsewhere could fall and engulf the employee.